A Study on the Method of Human Observation and Software Design

Jiang Wu, Qiqing Su, Hongyan Ou, Honglei Li, Chuanyin Ji and Chenhui Li

Abstract The observational test of human is to quantify human's observation by certain means. It is based on the existing theories. With the advancement of science and technology, the method of observational test is changing every day. Through compiling the software of human's observation and the existing observational test theories, we can develop software of human's observational test, which is based on the data base. This testing method written in the software not just puts the traditional paper testing in the computer, but also adds new testing means based on theory. If a lot of people use this observational testing software, then we can build a data base of different human observation levels for the next statistical analysis. Meantime, we tried to add the training module in the software to improve the observers' level of testing.

Keywords Observation · Test method · Database · Statistical analysis

1 Introduction to Observation and Testing Status

Observation is a combination of multiple senses. There are individual differences in human observation, and these differences with the innate quality and acquired practice and training are closely related. There are three important indicators of observation, namely breadth: refers to a person in the acquisition of specific external information and the amount of data can be extracted in the scope, type, quantity, etc.; precision: that people can get the accuracy and precision of information; speed: refers to the speed of access to information the extent of people [1].

Human observation as an important psychological indicator can be judged by some methods, such as by the quantitative things to respond to determine the time,

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through the identification of things to determine the degree of property and other methods. People have also made a number of test functions with the system, and methods to determine the quality of human observation are mainly divided into two types: the first is more in the laboratory of professional testing system, mainly used in scientific research. This system is relatively accurate test results, but the system is huge, expensive, and difficult to debug operation; the second method is constantly in the process of practice to explore the universality of some of the test means and the application of these tools is simple, Interference by the external environment is small, but the accuracy is not very high.

Now many social positions in the selection of human observation have certain requirements, but due to the lack of compliance with the requirements of the observation test method, the more choice is through the second method of some simple means to select the qualified personnel; however, this method is usually based on paper media as the carrier, and the test process that is not tightly organized will lead to inaccurate test results. The computer software with its irreplaceable superiority and its powerful data analysis and processing power can make up for these shortcomings, so the design of observation test software is very important.

People's observation is not innate, but in the latter part of learning and training in practice, the late learning and practice often take a long process and sometimes have to pay some unnecessary costs. On the other hand, the observation of the test itself is a training to improve the process, therefore, in the same system will combine testing and training, can greatly enhance the efficiency of the system and practical performance.

2 The Typical Method of Observational Testing

Through the analysis of the definition of observing power and its determinants, as well as combining the existing test methods, we selected four relatively wide ranges of methods as software testing and training methods.

2.1 Bai li tiao yi

A fixed interface is randomly divided into 100 randomly shaped small pieces; each set a small range of 1–100 random numbers, by detecting the number of subjects used to find the time to determine the quality of its observation.

The specific situation is shown in Fig. 1. This method focuses on the observation of the speed and breadth of the observed two qualities, the use of subjects on the understanding of the laws of digital logic and observes the speed and breadth of things to be tested.

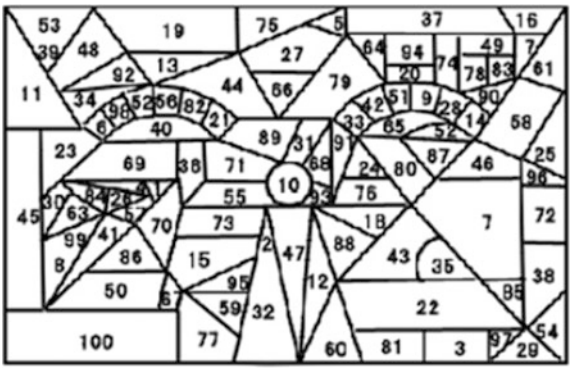

Fig. 1 Bai li tiao yi [2]

Fig. 2 Huo yan jin jing

2.2 *Huo yan jin jing*

The subjects observed a number of test images within a certain range to find a different picture of all the test pictures that were slightly different from the others. By calculating the subjects completed a series of reactions to determine the time spent watching its good or bad, the specific situation shown in Fig. 2. This method focuses on the observation of the speed and breadth of the observed two qualities, the use of the color and line combination of the differences in understanding to observe the picture, and to respond. We can use the reaction time to quantify the level of observation of the subject.

2.3 *The Public to Find Him*

Set the two batches of pictures, the second batch of pictures in the first batch of pictures on the basis of some minor adjustments (for example, the picture on the 1–3 picture content replaced with other forms), so that subjects observed a picture

Fig. 3 Huo yan jin jing

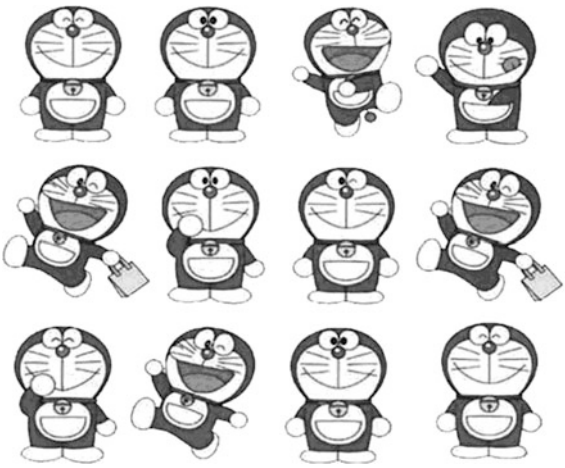

Fig. 4 Huo yan jin jing

of the first picture Time, and then converted into the second batch of pictures. By calculating the accuracy of the subjects to adjust the identification and completion of a series of reactions to determine the time required for observation of good or bad. The specific situation is shown in Figs. 3 and 4. This method on the subjects observed the speed, breadth and accuracy of the three qualities are reflected, the main use of people to observe the degree of sophistication, comprehensiveness and speed to be measured.

2.4 Excellence

Set up a complex pattern composed of triangles, and let the subjects count the number of all the triangles, and according to the number of triangles and the reaction time to measure the level of their observation, the specific situation is shown in Fig. 5/RTI & gt; This method focuses on the quality of observation accuracy, but also reflects the speed of this quality. The use of people in the observation of things when the degree of sophistication and the speed of conversion between different objects to be intuitive to quantify.

3 Software Design

3.1 Software System Flow Diagram

If the above method is realized by software, it not only can improve the efficiency of testing and training, but also can effectively avoid the waste of resources. For the design of software, we have the spirit of science, practical, broad principles, as well as multi-functional, modular requirements, and strive to comprehensive and focused. Software design process is shown in Fig. 5.

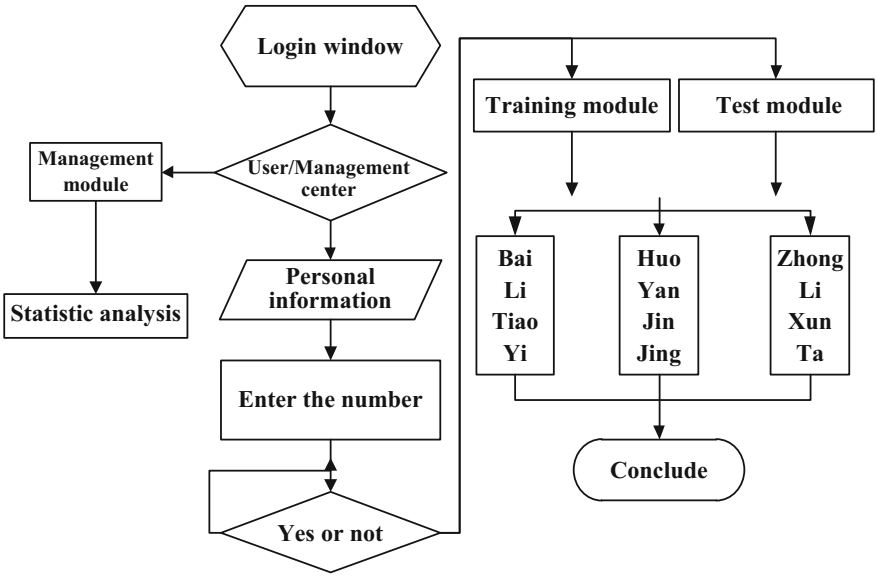

Fig. 5 Flow chart

3.2 Test Method Implementation Module

Test method to achieve through the human–computer interaction interface to display, according to the test idea, requiring continuous testing process, that is, all types of test methods to complete a test, the software then record the total score, the following is a specific method Module:

3.2.1 Barry Pick One

This module contains the timer, buttons, enter the text box, display text box and other controls. By using the idea of object-oriented programming, the relevant events are added to the button to start the source code, and the starting order of the button is edited through the functional logic relationship. The purpose of each test content is reached. Tester in the testing process, the front interface timer shows the time changes, the system record the location of its click, and record each of its number of time-consuming and accurate degree. According to the test method for multiple program operation, and debugging and upgrade the program.

3.2.2 Eye Gold Eyes

This module contains the timer, buttons, and pictures, enter the text box, display text box and other controls. In the database into a large number of pictures for testing, add the button to read the picture source code, through the edit button to bring up the database image (the picture appears random); the tester during operation, the system will record its time, while recording click accuracy. Through the trial debugging to modify and upgrade the program.

3.2.3 Find Him in the Public

The module also contains buttons, pictures, display text boxes and other controls. In the database into the test picture, through the button to control the transformation of local pictures, clicked by the tester to change the location of the picture, the system automatically records the number of clicks, click on the accuracy or not, and display its use of time. According to the test process several tests, find out, and debug and upgrade the program.

3.2.4 Excellence

Software implementation: This module contains buttons, pictures, display text box and other controls. In the database into the test image, by displaying the cursor coordinates check triangles, and set the program and deposit all data types, to avoid duplication of results.

Above a brief introduction to the four test method implementation module, the corresponding can also set the test module. Training module is still the essence of the test method, so the training module is also divided into a hundred miles, one eye, the public looking for him and excellence of four sub-modules, modules independent of each other, as a training module; the tester can choose their own training types and the corresponding difficulty level, and the system will automatically save the training results.

3.3 Other Expansion Modules

3.3.1 Data Import and Export Module

Data import and export module refers to the personnel to use the software for observational testing and training, the software needs to first access the Access database, the test training data into the software, test and training results will be stored in the database, can be derived into other types The data. Its import principle is sql statement and source code using Delphi integrated ADO control channel, control data import. For the export of data is to use the same data into the principle of the inverse of the principle of the data into the Access database, such as the need for other types of data (word, Excel, etc.) and then use the corresponding source code to export data from the Access database.

3.3.2 Results Statistical Analysis Module

Performance statistical analysis module refers to the staff to do the testing and training, the results of their statistics and analysis, including testing and training in two parts. Performance statistics is the staff to do every test and training classification in turn into the Access database, according to a certain order of staff performance [3]. Score analysis function is based on personnel and their performance, through different comparison sort, give a preliminary performance evaluation.

4 Software Implementation Platforms

In the course of design and development, the rapid prototyping method can be used in the design and development. The framework of the evaluation system, data connection, and code debugging and system test are completed by using Delphi, and the corresponding test database is established by Access to ensure the smooth design of the software get on [4].

4.1 Programming Software Delphi

Database application development with Delphi7.0, the focus is to deal with a variety of database components, and database components can be linked to five kinds of objects: Session (database session), Database (database), Dataset (Dataset), DataSource (Data source), Data control (data control components also known as data controls that are data-aware components), four collectively referred to as data access (Data Access) components [5].

4.2 Database Access

Microsoft Office Access is a database management system that combines the graphical user interface of the database engine with the software development tool [6]. The data are stored in its own format on the Access Jet database engine. It can also import or link data directly (the data are stored in other applications and databases).

5 Conclusions

In this paper, the author makes a systematic analysis of human's observation test and training software's requirement, combined with the characteristics of observing power and uses Delphi7 and Access database software platform to realize human's observation test and training software. Personnel through this software, you can observe the scientific test, while training can help to improve attention.

As the ability level can not reach a higher level of demand, in the realization process, there inevitably exist some problems, hoping to get criticism and suggestions.

Compliance with Ethical Standards The study was approved by the Logistics Department for Civilian Ethics Committee of Air Defence Forces Academy.

All subjects who participated in the experiment were provided with and signed an informed consent form.

All relevant ethical safeguards have been met with regard to subject protection.

References

1. http://sm.baike.com/item/673bc16a83eb6e9a7da9f24bc278ace7.html?from=smsc&>uc_param_str=dnntnwvepffrgibijbpr
2. Pang Z Man-machine-environment system engineering. Institute of Air-Defence Unit: Zhengzhou
3. Xu R, Zen J (2006) SQL server and basic of database application. Tsinghua University Press: Beijing, pp 89–120
4. Li C (2006) Delphi7.0 of advanced programming and application of development. China Water Power Press: Beijing, pp 35–76
5. Songsheng Delphi information system development example.China Achine Press, pp 5–26
6. Guangwu K, Wang X (2002) Information system analysis and design. Mgmt Syst Des 2:1–3